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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,191	02/14/2004	Steven Clyde Hill	ARL 04-01	2190

21364 7590 12/28/2005

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EXAMINER	
DIRAMIO, JACQUELINE A	
ART UNIT	**PAPER NUMBER**
1641	

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/708,191	HILL, STEVEN CLYDE	
	Examiner	Art Unit	
	Jacqueline DiRamio	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) *32 and 33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☒ Claim(s) *1,27 and 28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 February 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group I, claims 1 – 31 in the reply filed on November 9, 2005 is acknowledged. The traversal is on the ground(s) that the inventions found in Groups I – III operate on the same principles and are therefore not distinct. This is not found persuasive because the devices found in Groups I – III are independent and patentably distinct due to their different structural limitations, as discussed in the previous office action. The fact that the devices operate on the same principle is irrelevant because the search for a device is not based on its principle, but on its structural limitations. Therefore, the structural limitations, which cause the delineated inventions to be independent and patentably distinct, would require undue burdensome search and examination.

The requirement is still deemed proper and is therefore made FINAL.

Claims 32 and 33 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected inventions.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

In paragraphs [0046] – [0048] of the specification, reference to "analyte 80" is described in regard to Figure 1A, however, this reference number is not found in Figure 1A.

In paragraph [0054], references to "structure-switching signaling aptamer **820**" are disclosed, but not found in the referred Figure 2.

In paragraphs [0056] and [0057], references to "downstream ring 422" are disclosed in regard to Figures 3A – 3D, but this reference number is not found in the referred figures.

In paragraph [0058], reference to "CEDB electrodes 464" is disclosed in regard to Figure 3E, however, this reference number is not found in Figure 3E.

In paragraphs [0060] and [0061], references to "holding region 622" and "measurement region 624" are disclosed in regard to Figure 4A, however, these reference numbers are not found in Figure 4A.

In paragraph [0063], reference to "two receptacles 690" is disclosed in regard to Figure 4B, however, this reference number is not found in Figure 4B.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description:

In Figures 1A – 1C, 5 and 6, reference number 126 is displayed, but this reference number is not described in the specification.

In Figures 3E and 3F, reference numbers 448D and 448E are displayed, but these reference numbers are not described in the specification.

In Figure 4B, reference number 692 is displayed, but this reference number is not described in the specification.

In Figures 5 and 6, reference number 446 is displayed, but this reference number is not described in the specification.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

At the end of paragraph [0049] in the specification, the term "analyte 800," is written, but this appears incorrect, because the analyte was labeled as reference number "80" in the previous sentences and paragraphs.

In the middle of paragraph [0054], two figure references to "Stem-2 822" are disclosed, but this figure reference was previously labeled as "Stem-2 824," and is also displayed as "Stem-2 824" in Figure 2.

Also, in the middle of paragraph [0054], figure reference "FDNA 832" is disclosed, but this figure reference was previously labeled as "FDNA 830," and is also displayed as "FDNA 830" in Figure 2.

Near the end of paragraph [0058], figure reference "electrodes 460" is disclosed, but this figure reference was labeled as "electrodes 464" in previous sentences.

In the second line of paragraph [0065], figure reference "CDG" is labeled as 250, but this figure reference was previously labeled 200 throughout the specification and the "charger" was labeled as 250.

Appropriate correction is required.

Claim Objections

Claims 1, 27 and 28 are objected to because of the following informalities:

Claim 1, part (b) recites a "charged droplet generator," but then changes the recitation to the "charged-droplet generator."

Claim 1, part (e) recites a "droplet analysis subsystem (DAS)" consisting of a list of limitations (i)-(iv), which are separated from each other by a comma (,), but should be separated by a semi-colon (;) as seen in the previous list of limitations (i)-(iv) under part (c) for the "particle-droplet-collision subsystem (PDCS)."

Claims 27 and 28 are duplicates of each other.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 18 and 19 recite the term "the CDG," which lacks antecedent basis.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1 – 31 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 – 19, 21 – 27 and 31 of copending U.S. Application No. 11/126,515 in view of Arnold et al. (US 5,532,140) and Lamb et al. ("The Environmental Control of Individual Aqueous Particles in a Cubic Electrodynamic Levitation System," *Aerosol Science and Technology*. Vol. 24: 263-278 (1996)).

The copending application teaches an aerosol particle analyzer (APA) for measuring the amount of analyte in airborne particles. The APA comprises:

"(a) an analysis liquid chosen that when mixed with the particles, an optical property of the liquid varies according to the amount of analyte in the particles;

(b) a charged droplet generator, having a charged-droplet generator output, that generates a charged droplet of the analysis liquid (CDAL) and ejects it out of said charged-droplet generator output when signaled to do so;"

(c) a particle-droplet-collision subsystem (PCDS) that contains a charged-droplet input connected to the charged-droplet generator output, a charged particle input, a PDCS CDAL output, and a vacuum connection that : (i) accepts the gas containing the charged particles via the charged particle input; (ii) accepts the CDAL via the charged-droplet input so that the CDAL moves into the particle-droplet collision region to collide with the particle; (iii) ejects the DCAL that has combined with the particle out of the PDCS CDAL output;

(d) a vacuum pump connected to the PDCS vacuum connection that draws the gas and particles into the PDCS, where the gas and any particles not combined are then evacuated;

(e) a droplet analysis subsystem (DAS), having a DAS input orifice for accepting the CDAL that has combined with the charged particles consisting of: (i) an electrodynamic levitator that levitates the CDAL that has combined with the charged particles ejected by the PDCS and holds them while the reaction between the CDAL and the analyte occurs; (ii) a means to control the motion of the particles in the electrodynamic levitator; (iii) a container that surrounds the levitated CDAL and that is substantially airtight, except for the orifice through which the CDAL enter, so that the CDAL does not evaporate quickly, (iv) a means to detect changes in the optical property of the levitated CDAL, so that the amount of analyte in the CDAL, and in the particles that combined with the CDAL, can be determined from these measurements of the optical property. The droplet analysis subsystem can also include a receptacle to collect and store the CDAL after the optical property of the CDAL has been measured, which is recited in the copending application's claim 13.

The missing limitation of a charger, which imparts a charge to the particles, which is found in the instant application's claim 1, part (c), is later recited in the copending application's claims 9-11.

With respect to the limitations found in the instant application's claims 2 – 10, 14 – 17, and 20 – 31, the copending application's claims 1 – 19, 21 – 27 and 31 anticipate these recited claims and limitations.

However, the copending application fails to teach that the PDCS also contains an electrodynamic levitator, wherein the levitator is a cubic electrodynamic balance.

Arnold et al. teach a method and apparatus for suspending microparticles wherein a linear quadrupole electrodynamic levitator is utilized by the device. The use of the electrodynamic levitator allows for isolating, selecting and joining individual aerosol particles, as well as a means for moving the particles to particular positions along an axis (see Abstract and column 3, lines 4-11, and lines 56-58). Lamb et al. also teaches the use of electrodynamic levitation for investigating particles in a gaseous environment. Specifically, Lamb et al. focus on a cubic electrodynamic levitation system, which is beneficial because it permits three-axis position control of a particle (see Abstract in particular).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include with the particle-droplet-collision subsystem (PCDS) of the copending application an electrodynamic levitator as taught by Arnold et al. because Arnold et al. teaches the benefit of an electrodynamic levitator in order to isolate, select and join individual aerosol particles, as well as a means to move the particles to particular positions along an axis. It also would have been obvious to utilize a cubic electrodynamic levitation system, in particular, as taught by Lamb et al. because Lamb et al. teach the benefit of cubic electrodynamic levitation in order to permit three-axis position control of a particle.

Claims 1 – 15, 18 – 20, and 22 – 31 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 – 8, 10, 13, and 15 – 22 of copending U.S. Application No. 10/816,579 in view of Arnold et al. (US 5,532,140) and Lamb et al. ("The Environmental Control of Individual Aqueous Particles in a Cubic Electrodynamic Levitation System," *Aerosol Science and Technology*. Vol. 24: 263-278 (1996)).

The copending application teaches an aerosol-particle analyzer (APA) for measuring an analyte in particles in gas comprising:

(a) an analysis liquid chosen such that when the analysis liquid is mixed with the particles, an optical property of the analysis liquid varies according to the amount of the analyte in the particles;

(b) an analysis-liquid-handling subsystem (ALHS), i.e. charged-droplet generator, consisting of an analysis-liquid container (ALC), which holds a charged volume of the analysis liquid (CVALH), i.e. CDAL;

(c) a charger that imparts a charge to airborne particles drawn into it;

(d) a substantially gas-tight container, having a gas-tight connection to the ALHS such that the CVALH extends into the gas-tight container, i.e. PDCS;

(e) a vacuum pump connected to the gas-tight container that draws gas and particles into the gas-tight container;

(f) a means to measure changes in the optical property of the CVALH, i.e. DAS; and

(g) a collection vessel to collect and store the droplet ejected after the optical property of the CVALH has been measured, i.e. a receptacle.

With respect to the limitations found in the instant application's claims 2 – 10, 14, 20, and 22 – 31, the copending application's claims 1 – 8, 10, 13, and 15 – 22 anticipate these recited claims and limitations.

However, the copending application fails to teach that the gas-tight container (PDCS) or the means to measure changes in the optical property of the CVALH (DAS) contain an electrodynamic levitator, particularly a cubic electrodynamic balance in the gas-tight container (PDCS).

Arnold et al. teach a method and apparatus for suspending microparticles wherein a linear quadrupole electrodynamic levitator is utilized by the device. The use of the electrodynamic levitator allows for isolating, selecting and joining individual aerosol particles, as well as a means for moving the particles to particular positions along an axis (see Abstract and column 3, lines 4-11, and lines 56-58). Lamb et al. also teaches the use of electrodynamic levitation for investigating particles in a gaseous environment. Specifically, Lamb et al. focus on a cubic electrodynamic levitation system, which is beneficial because it permits three-axis position control of a particle (see Abstract in particular).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include with the gas-tight container (PCDS) of the copending application an electrodynamic levitator as taught by Arnold et al. because Arnold et al. teaches the benefit of an electrodynamic levitator in order to isolate, select

and join individual aerosol particles, as well as a means to move the particles to particular positions along an axis. It also would have been obvious to utilize a cubic electrodynamic levitation system, in particular, as taught by Lamb et al. because Lamb et al. teach the benefit of cubic electrodynamic levitation in order to permit three-axis position control of a particle.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacqueline DiRamio whose telephone number is 571-272-8785. The examiner can normally be reached on M-F 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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12/22/05